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# Development and Training induced Plasticity of Working Memory

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## Abstract

Working memory (WM) is closely related to top-down attention, with both functions depending on a common network of frontal and parietal regions. WM is important for academic performance and impairments are associated with distractibility and inattention in several clinically defined groups, such as in ADHD. WM is thus a key function for cognitive development during childhood and it is important to find out factors contributing to its development. In a longitudinal study of 6-20 year old individuals we investigated how genetic polymorphisms, environmental factors and brain development is associated with development of WM capacity. Several genes affect brain development and WM. Structural maturation predicts future WM capacity. Parietal brain activity during WM trials was also a predictor of future math performance. We have also developed and tested a computerized method for training WM. Several studies have shown that WM can be improved by this method, and that performance improves also on non-trained tasks demanding WM. Moreover, improving WM also decreases the symptoms of inattention in everyday life. Klingberg and colleagues has also shown that training of WM changes brain activity in frontal and parietal regions, and is associated with changes in the density of dopamine D1-receptors in the cortex. Training of WM might thus be a non-pharmacological way to address the key cognitive function in children with low WM.

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